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International Environmental Damage Control: Some Proposals for the Second Best of All Possible Worlds

STEPHEN J. VASEK*

Recent meetings of international law experts have produced considerable debate over the type of international regime necessary to effectively control pollution.¹ Divergent views expressed range from the "survival approach" of Professor Falk² to the "grocery-list approach" of Christian Herter Jr.,³ Special Assistant to the Secretary of State for Environment.⁴ The "grocery-list approach" is an operational approach which involves doing what can be done by the use of available means including discussion to define common interests, international agreements based on those shared interests, unilateral action where appropriate and increased use of the UN for a variety of purposes such as environment monitoring and research. The survivalists recommend "a central guidance system that includes capabilities for monitoring, quick reaction, rationing, zoning, standard-setting and enforcement."⁵ An attempt will be made in the following discussion to report some major causes of international pollution, to provide a

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¹ One meeting was at the American Association of Law Schools Convention in December of 1970, held at Chicago, Illinois. Another meeting was held in New York, New York in April, 1970. See *Proceedings of the American Society of International Law*, 64 AMER. J. INT'L L. 211-38 (1970) [hereinafter cited as *Proceedings*].

² Falk, *Toward Equilibrium in the World Order System*, *Proceedings*, *supra* note 1. This approach is more fully developed in a book by Prof. Falk to be published early in 1971 by Random House, R. FALK, *THIS ENDANGERED PLANET* (1971).

³ See *Proceedings* at 214.

⁴ See *id.* at 233, comments of Professor McDougal.

⁵ *Proceedings*, *supra* note 1 at 222.

framework for the legal analysis of specific pollution events, to evaluate the probable effectiveness of the existing international system in preventing further environmental damage and to suggest some beneficial changes in that system.

I PRELIMINARY ANALYSES

A Matter of National Priorities

A point of analysis from which further analyses flow is that the protection of the environment is not the only interest of the nations of the world community and that the proper protection of a national environment rather than improper inattention to it is a matter of national priorities. Satisfaction of the perceived security needs of a nation, for example, can create risks of environmental damage. National defense has been used to justify the construction and testing of nuclear weapons and nerve gas rockets. The prevention of foreign aggression in Viet-Nam has been used to justify the use of chemical defoliants. The risks of environmental damage can be minimized by taking precautionary measures in building, testing and using such weapons, but the risks cannot be eliminated as long as national security interests are given a higher priority than environmental protection.

National security interests are not the only national values which conflict with protection of the environment. States can create an international environmental problem by their use of pesticides and fertilizers. Fertilizers can be carried into the oceans by water run-off from land; pesticides are carried into the oceans primarily by air currents.⁶ Pesticides such as DDT inhibit photosynthesis in phytoplankton,⁷ which is the food base for almost all living organisms in the seas and which are responsible for keeping about 70% of the oxygen in the air.⁸ Although there is little likelihood that DDT will cause a critical oxygen shortage in the world,⁹ DDT may have critical effects on the food resources

⁶ See Schacter and Serwer, *Marine Pollution Problems and Remedies*, 65 AMER. J. INT'L L. 84, 95-96, 101 (1971).

⁷ Wurster, *DDT Reduces Photosynthesis by Marine Phytoplankton*, 157 SCIENCE 1474 (1968). See also P. EHRLICH, *THE POPULATION BOMB* 56-57 (1968); F. GRAHAM, *SINCE SILENT SPRING* 115 (1970).

⁸ Schacter and Serwer, *supra* note 6 at 87. See also P. EHRLICH, *supra* note 7; GRAHAM, *supra* note 7.

⁹ Broecker, *Man's Oxygen Reserves*, 168 SCIENCE 1537 (1970).

available to man from the oceans.¹⁰ Inorganic fertilizers such as phosphates and nitrates can cause overfertilization of the seas with consequent plankton "blooms" and depletion of stocks of aerobic fish life.¹¹

Will India stop using pesticides and inorganic fertilizers in attempts to increase its agricultural production?¹² Will Latin American countries stop using DDT to control malaria-carrying mosquitos? The long-run solution to the ecology, food shortage and health conflict may be regulation of pesticide usage in controlling diseases, development of inexpensive substitute pesticides and decreasing population growth rates. In the short-run it is apparent that nations will give a higher priority to current health and food shortage problems than to the prevention of prospective environmental damage.

It has been estimated that populations in the less developed countries will increase by 2.6 billion people between the years 1960 and 2000,¹³ and it appears that, even considering probable technological advances, a correlative of the population growth will be increased environmental damage.¹⁴ Increase in population size will have more detrimental environmental effects in developed countries than in less developed countries because of the mass consumption-mass production ideologies prevalent in developed countries. Increases in population in developed countries will most likely be accompanied by correspondingly larger increases in power production—consumption than would be accompanied by a similar growth of populations in less developed nations; and since an ecologically safe power source does not yet exist, any increase in power consumption will result in more damage to our environment.¹⁵ Not only does population growth

¹⁰ *Id.* at 1538. See also P. ERHLICH, *supra* note 7; F. GRAHAM, *supra* note 7.

¹¹ See generally Schacter and Serwer, *supra* note 6, at 101.

¹² India used over 6 million pounds of DDT in 1967 and has plans for increasing the amount of farm land under chemical protection from 10 per cent to about 25 per cent. Substitutes for DDT cost two to six times as much as DDT. N.Y. Times, Nov. 29, 1969, at 1, col. 4. The U.S. used 40 million pounds of DDT in 1967, but the government has announced plans to all but ban the use of DDT within two years. N.Y. Times, Nov. 13, 1969, at 20, col. 2.

¹³ Report of the Secretary General on Problems of the Human Environment, U. N. Doc. E/4667 at 8 (1969).

¹⁴ See generally P. ERHLICH, *supra* note 7.

¹⁵ Interview with Paul Erlich, PLAYBOY, Aug., 1970, at 55. "[T]here is no ecologically 'safe' method of producing and using power. Even if electricity generation weren't dependent on the the burning of fossil fuels which emit deadly chemical and particulate pollution into the air, power plants would create dangerous thermal pollution." *Id.* at 64.

mean more pollution, it also signifies an increasing rate of consumption of irreplaceable resources. The United States with less than 1/15 of the world population uses more than one-half the resources consumed in the world each year.¹⁶ At present rates of consumption, the world's reserves of oil will be used up within 100 years, coal reserves may last 300 to 400 years, lead zinc and tin reserves will probably be exhausted in 30 years, copper in 100 and nickel in 200 years.¹⁷

The mass production—mass consumption values of industrialized countries have a corollary in less developed countries *i.e.*, the revolution of rising expectations. As stated by a spokesman from Malaysia, "Some of us would rather see smoke coming out of a factory and men employed than no factory at all. It is, after all, a matter of priorities."¹⁸ Most international experts agree that the less developed countries place a higher priority on economic development than on prevention of pollution or conservation of irreplaceable natural resources.¹⁹ Resolution 1803 (XVII) of the General Assembly (Declaration of Permanent Sovereignty Over Natural Resources) adopted by a vote of 87 to 2 with 12 abstentions in December, 1962, recognizes "the inalienable right of all states freely to dispose of their natural wealth and resources in accordance with their national interests."²⁰ Although Resolution 1803 was passed in response to the question of whether nations

¹⁶ P. ERHLICH, *supra* note 7, at 133.

¹⁷ Erhlich, Interview, *supra* note 15, at 60. U.S. spare crude oil capacity may be virtually depleted by the close of 1971. Between 1970 and 1985 the U.S. will need 100 billion barrels of oil and the oil industry must "produce as much oil and gas in the next 15 years as it produced in the last 110 years. . . ." *Spare Crude Oil Capacity Fading Fast*, 68 OIL & GAS J. 62 (1970).

The earth's coal supplies are sufficient to serve as a major source of industrial energy for a few hundred years. Petroleum can be expected to supply its present large fraction of total power needs for a limited time.

And natural gas is our scarcest fuel resource.

COUNCIL ON ENVIRONMENTAL QUALITY, FIRST ANNUAL REPORT: ENVIRONMENTAL QUALITY, 160 (Transmitted to Congress, August, 1970). This same report includes an estimate that in 30 years U.S. demand for nonfuel minerals will be 65 billion dollars and U.S. production of nonfuel minerals will be 19 billion dollars. *Id.* at 157. For a detailed comprehensive document on resource availability see "Resources and Man," Special Joint Committee of National Academy of Sciences, Sciences-National Research Council (1969).

¹⁸ Saved Adam al-Jafri, vice-president of the Consumer Association in Malaysia, N.Y. Times, Aug. 3, 1970, at 2, col. 1.

¹⁹ See generally *Proceedings*, *supra* note 1, at 211-38.

²⁰ The inalienable right of permanent sovereignty over natural resources is also affirmed in Resolution 626 (VII) of December 21, 1952 (Right to Exploit Freely Natural Wealth and Resources) and Resolution 2158 (XXI) of November 25, 1966 (Permanent Sovereignty Over Natural Resources).

have the right to expropriate foreign interests in domestic natural resources and not with the problem of exploitation of natural resources per se. Resolution 1803 reflects the almost religious belief that no nation has the right to interfere with any other nation's exploitation of its resources.

National defense, agricultural production and industrial development, then, are three domestic values which are frequently given priority over environmental conservation. These national values represent governmental concern for the well-being of a nation's inhabitants; and they would present a similar problem of priorities to a world government that they present to national governments. A world government might, however, eliminate the national defense consideration, subordinate industrial development values to environmental protection values and redistribute wealth to solve some of the food shortage and health problems. Whether the present international regime is adequate to cause nations to subordinate other goals to the goal of environmental protection is one question with which this paper attempts to deal.

Environmental damage caused because of lack of knowledge concerning the environment or because of negligence can also be viewed at least in part as damage caused by priority rankings. Lack of knowledge can be corrected in large part by research and dissemination of information. Negligence damage can be reduced by requiring that greater care be exercised. Research and greater care have one thing in common: They both usually cost someone money.

Although problems of population growth and resource depletion, which are intimately intertwined with the pollution problem, are not analyzed in this paper, it should be noted that changes in socio-economic patterns introduced in an attempt to solve the population growth and resource depletion problems *e.g.*, changing the status of women so that they are accepted into the work force and the recycling of resources, are likely to change the nature and seriousness of the pollution problem in some as yet indeterminate manner. For example, pollution may increase because of new industries created to recycle resources and provide more jobs for a larger work force, or may decrease due to a smaller population growth rate and decrease in raw materials exploitation activities. Technological advances are also

likely to change our pollution problems in some indeterminate manner *e.g.*, development of the SST and development of phosphate free detergents. It is reasonable to assume that regardless of new socio-economic patterns, reduced population growth and technological advances, preservation of man's environment will remain a matter of high priority for political scientists as long as man continues to increase his capabilities for altering the environment.

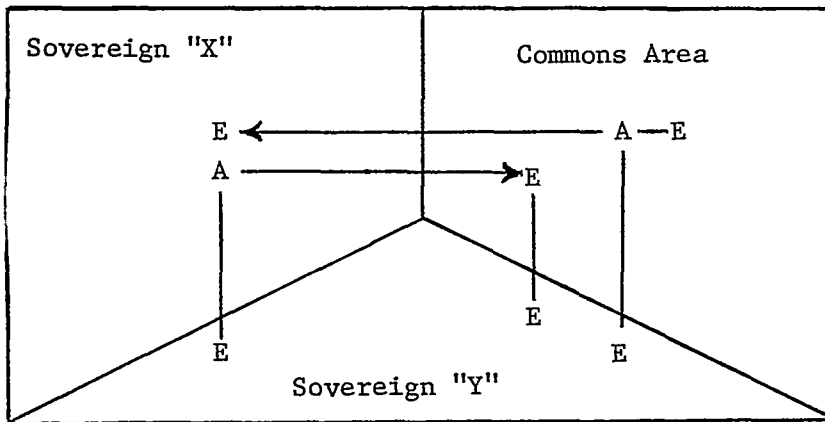
International Environmental Interrelationships

A second point of analysis from which further analyses flow is that nations, and those who would propose international actions, must be cognizant not only of national priorities, but also of international environmental interrelationships. The place of the physical effects of polluting activities is frequently not limited to one area because the earth is a single, closed ecological system. Death of the plankton in the ocean diminishes the supply of food in the oceans which effects lives on land. Industrial fumes, carried by air currents beyond the polluting nation's boundaries, may be dispersed over other sovereign territories as well as over commons areas (those areas, such as the oceans, where no state is sovereign) causing different problems in each area to which the fumes travel. The following diagram depicts the variety of consequences possible resulting from any one activity, each of which makes the initial activity a matter of international concern.

In addition to the possibility of one activity causing detrimental effects in several areas, there is also the possibility that activities carried on by two or more sovereigns will collectively cause detrimental environmental effects in any number of areas. For example, almost all nations allow particulate matter to escape into the atmosphere, thereby altering the total atmosphere of the Earth. Similarly, many nations dump wastes into the ocean, and the result may be ecological damage to the entire ocean.

Location of pollution causing activity, either within a sovereign's territory or in an international commons area, is used as one organizing theme in this paper because of the differences in the legal status of these areas. Another organizing theme in this paper is based upon the distinction between cases where one or

*Sovereign and Commons Areas; Individual Responsibility:
Activities (A) and Harmful Environmental Effects (E)*



a very small number of states are causing recognizable environmental damage and situations where a large number of states are collectively causing widespread environmental damage. This latter distinction between individual and group responsibility situations is important because certain regulatory techniques effective in the case of individual responsibility are not effective in cases involving group responsibility, especially when the effects of the group's activities are widely dispersed causing a little damage to everyone.

International effects of pollution are evident in situations even where the pollutants themselves do not physically leave the territory of the polluting state. If country A allows its wood pulp industry to pollute and country B requires its wood pulp industry to install and maintain pollution control devices, then the industries of country B, if they are in competition with industries of country A on the world market, are at a competitive disadvantage (ignoring other advantages that either country might have such as supplies of natural resources, pools of skilled and unskilled labor, technological and managerial know-how, availability of capital). The competitive advantage created by the absence of national legislation requiring pollution abatement expenditures in country A can also serve to attract foreign investors to establish new wood pulp plants in country A. The fact that the true social

costs of pollution in country A (*e.g.*, loss of labor due to illness, increased difficulties in growing crops, loss of a scenic countryside) are hidden and difficult to measure in monetary terms may make lax pollution standards a politically attractive method for the leaders of country A to increase exports and attract foreign investment. It is possible that the environment of country A has a greater pollution absorption capacity than does the environment of country B; and therefore, lax pollution standards will not cause environmental harm in country A. This greater absorption capacity of A's environment is a natural resource of country A, much like deposits of iron ore, coal or oil, and the competitive advantage gained from the presence of this natural resource arguably should be differentiated (for purposes of formulating international pollution standards) from the competitive advantage gained by a sovereign's political choice to endure environmental damage to gain a competitive advantage.

Finally, activities which do not themselves pollute the environment anywhere can foster polluting activities. For example, the U.S. export of "Doris Day in Suburbia" movies to South America may be partially responsible for the revolution of rising expectations in South America and the consequent desire for polluting industrialization.²¹ U. S. demand for German cuckoo clocks may lead ultimately to pollution of the Black Forest, and the insatiable U.S. market for transistor radios can be viewed as a cause of pollution in Japan.

Activities within sovereigns which produce international environmental effects need not always produce adverse effects. For example, the development and export of pollution abatement technology or equipment will presumably lessen pollution in the world. A U.S. decision to deny landing space to supersonic transports would result in the elimination of perhaps the single largest market for flights of the SST and production or flight of such planes would become less profitable or more unprofitable. The U.S. decision to require antipollution devices upon all automobiles sold in the U.S. can influence foreign auto makers to install such devices on all cars they produce.²² Reduction of tariffs

²¹ Cf. P. EHRLICH, *supra* note 7, at 23.

²² Since the foreign producers must have the technology, equipment and skilled labor necessary to produce and install the devices on cars destined for the

(Continued on next page)

on the importation of pollution abatement equipment and special tax treatment for pollution abatement expenditures could also help to reduce international pollution.

II. ACTIVITIES WITHIN A SOVEREIGN'S TERRITORY

Within its territory each nation is sovereign. "A sovereign state . . . claims the power to judge its own controversies, to enforce its own conception of its rights to increase its armaments without limit, to treat its own nationals as it sees fit, and to regulate its economic life without regard to the effect of such regulations upon its neighbors."²³ Article 2(7) of the U.N. Charter expounds a corollary of the concept of sovereignty:

Nothing contained in the present Charter shall authorize the United Nations to intervene in matters essentially within the domestic jurisdiction of any state or shall require the Members to submit such matters to settlement under the present Charter

Specification of matters within the domestic jurisdiction of a state and delineation of the nature of sovereignty are controversial subjects.²⁴ States have increasingly recognized the need to limit their sovereignty in the past decade *e.g.*, the proposed Strategic Arms Limitation Treaty would limit the right to arm, the Human Rights Conventions set certain criteria for treatment of nationals and article 16 of the Charter of the Organization of American States prohibits the use of economic or political coercive measures to

(Footnote continued from preceding page)

U.S. market, the cost of putting such devices on all cars is greatly reduced. See the report of Ralph Nader's attempts to get Japanese manufacturers to stop producing cars for the domestic market which are less safe than those sold in the U.S., to end dual-pricing for domestic and foreign markets on electrical appliances and to set the pace in anti-pollution devices. The Courier-Journal, Louisville, Ky., Jan. 18, 1971, at 1, col. 2.

²³ International Conciliation Pamphlet, 1941 as quoted in J. BRIERLY, *THE LAW OF NATIONS* 47 (6th ed. 1963).

²⁴ Compare J. BRIERLY, *id.* at 47:

To the extent that sovereignty has come to imply that there is something inherent in the nature of states that makes it impossible for them to be subjected to law, it is a false doctrine which the facts of international relations do not support.

with Oppenheim's view that sovereignty is external independence and territorial and personal supremacy with limitations imposed on these powers only by express consent (treaties or tacit consent (custom)). L. OPPENHEIM, *INTERNATIONAL LAW* 24, 254-64 (7th ed. 1948).

force the concession of benefits from another state.²⁵ Concurrently with the increasing consensual limitations on sovereignty there has been increasing condemnation of interference in a nation's domestic affairs.²⁶ The net effect of these trends is to give greater protection to a more limited concept of sovereignty than previously existed.

Professor Falk argues that "[s]overeignty is too *competitive* in its external relations and too *exclusive* in its internal relations to provide a rational basis for managing land-based activities."²⁷ The validity of his conclusion depends, in part, on the definition of sovereignty and, in part, on the presence or absence of controls regulating competition among states.

*Physically Direct Effects In Another Sovereign's Territory—
Individual State Responsibility Ascertainable*

The concept of sovereignty does not protect a state whose domestic-based activities pollute areas beyond that state's boundaries. At least two cases can be cited in support of the proposition that a State must prevent such use of its territory as would violate the rights of other foreign states and their nationals: the *Trail Smelter* (United States v. Canada) case²⁸ and the *Corfu Channel* case.²⁹

In the latter case mines which could not have been laid without the knowledge of the Albanian Government were placed in the Corfu Channel sometime during 1946. Two British warships were damaged by the mines and the International Court of Justice held Albania liable for the damage because of Albania's failure to provide notice of the existence of the minefield in Albania ter-

²⁵ The Strategic Arms Limitation Treaty is not yet a reality, N.Y. Times, Jan. 9, 1971, at 1, col. 2, and the Human Rights Conventions have not been ratified by the U.S. See 2 D. O'CONNELL, INTERNATIONAL LAW 749-52 (1970). Article 16 of the OAS charter was not mentioned in a U.S. court decision which concluded that the U.S. could cut off sugar imports from Cuba. *Banco Nacional de Cuba v. Sabbatino*, 307 F.2d 845, 866 (2d Cir. 1962). Although these limitations on sovereignty have not yet (and may never) become effective, nations are discussing such limitations.

²⁶ See, e.g., Declaration on the Inadmissibility of Intervention in the Domestic Affairs of States and the Protection of their Independence and Sovereignty, Resolution 2131 (XX), U.S. Doc. A/Res. 1, adopted by the General Assembly on Dec. 21, 1965, 60 AMER. J. INT'L. L. 662 (1966). The declarations on permanent sovereignty over natural resources, *supra* note 24, are of a similar nature.

²⁷ Falk, *Toward Equilibrium in the World Order Setting*, 64 AMER. J. INT'L. L. 217, 223 (1970).

²⁸ 35 AMER. J. INT'L. L. 684 (1941).

²⁹ [1949] I.C.J. 4; 43 AMER. J. INT'L. L. 558 (1949).

ritorial waters. (Although these were Albanian territorial waters they were also international straits through which ships of all nations in time of peace have a right of innocent passage which is not subject to suspension.) The Court stated that the duty of notification was based on "certain general and well-recognized principles, namely: elementary considerations of humanity, even more exacting in peace than in war; the principle of the freedom of maritime communication; and every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States."³⁰

The *Trail Smelter* case involved sulfur fumes emitted from a lead and zinc smeltering plant located in Canada which were carried by air currents into the U. S. Up to 10,000 tons of sulphur were put into the air each month by the Canadian plant in 1930 but this was reduced to 3,875 tons per month by 1940, mainly by the addition of sulphuric acid and elemental sulphur production units to the smelter plant operation. The International Joint Commission, an arbitral tribunal established by treaty between the United States and Canada,³¹ concluded that "under the principles of international law, as well as of the law of the United States, no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence."³²

The burden imposed by this rule, establishing by clear and convincing evidence that serious injury will occur in the future,

³⁰ The Corfu Channel Case, 43 AMER. J. INT'L. L. 558, 570-71 (1949).

³¹ Signed at Ottawa, April 15, 1935, duly ratified by the U.S. and Canada, 49 STAT. 3245 (1935).

³² *Trail Smelter Arbitral Tribunal Decision*, 35 AMER. J. INT'L. L. 684, 716 (1941). The precedential value of the *Trail Smelter* decision has been impugned because the Tribunal based its conclusion upon principles derived mainly from practices between states which were members of national federations. Manner, *Water Pollution in International Law*, in United Nations Economic Comm'n. for Europe, Conference on Water Pollution Problems in Europe 446, 452 (U.N. Doc. ECE/Water Poll./Conf./12, 1960). It has also been claimed that "the opinion of the tribunal with respect to the international liability was not warranted by the facts of the case" since Canada had assumed liability. Farber, *Pollution of the Sea*, 1 U.C.D. L. REV. 167, 172 (1969). Nevertheless, it was necessary for the Tribunal to ascertain the international law standard of liability to determine the scope of Canada's liability. See Part Three, *Trail Smelter Arbitral Tribunal Decision*, 35 AMER. J. INT'L. L. 712-17 (1941). Also, most scholarly writings and opinions expressed by international organizations support the Tribunal's finding of liability in international law. See Manner *supra* at 453-466, and Farber, *supra* at 173-74 for collections of citations to these writings and opinions.

is extremely difficult to meet because of lack of scientific knowledge concerning the environment and the lack of an adequate environment monitoring system. For example, SST flights will leave water vapor clouds in the stratosphere and sufficient cloud coverage could reduce the amount of solar energy reaching the earth, bringing on a new ice age, or could create a thermal blanket, locking in heat on the earth and melting the polar ice caps. No one yet knows what the effects of SST flights would be,³³ but must we wait until the damage has been done? Environment protection necessitates the prohibition of any activities which are likely to cause serious environmental damage or which can cause environmental changes, the seriousness of which cannot be predicted with reasonable certainty.³⁴ Requirements that the case be one of "serious consequence" and that the injury be established by "clear and convincing evidence" may be satisfactory in limiting liability in claims for damages in cases before international tribunals, but rules of law should not hinder nations or international organizations in their attempts to prevent environmental damage from occurring whenever the damage which could be caused is of a serious nature.³⁵ Fortunately, nation-states are likely to act upon perceived possible serious dangers without waiting for clear and convincing evidence.³⁶

³³ Russell Train, Chairman of the White House Council on Environmental Quality has testified that the SST could have "serious consequences on climate" but the Department of Transportation has concluded that the fears expressed do not have "any substantial basis in fact." Research Topics, *Will the SST Pollute the Stratosphere?*, 168 SCIENCE 1562 (1970). See also Hohenemser, *Onward and Upward*, 12 ENVIRONMENT 22 (1970); Young, *Pollution, Threat to Man's Only Home*, 138 NAT'L GEOGRAPHIC 738, 748-53 (1970).

³⁴ See also Section 2(1) of the Draft Rules Concerning Changes in the Environment of the Earth prepared by David Davies Memorial Institute of International Studies, London, Study Group on the Law of Outer Space (1964):

2. Subject to the provisions of Section 3, no state or international body shall engage in or within the limits of its authority permit, operations which can cause changes in the environment of the Earth:

1. If the range and scale of these changes cannot be predicted with reasonable precision; . . .

Section 3 of the Draft Rules provide for liability for actual damage caused if the state permitting the dangerous activities has failed to consult "an international group of scientists of known competence," or, if that group of scientists "has been unable to predict the range and scale of the changes with reasonable precision," or, if the United Nations has determined "that a deleterious effect upon the life, health or growth of human beings is reasonably to be expected from such an operation."

³⁵ If the "serious consequence" requirement is retained in determining liability for damages by international tribunals after injury occurs, the preventive effectiveness of the rule of liability for damages is substantially diminished.

³⁶ See, e.g., discussion of nerve gas dumping episode, *infra* note 57 and accompanying text.

It may be argued that, in order to encourage nations to consult with an international group of scientists or the U.N. before allowing or engaging in possible ecologically harmful activities, there should be no liability in cases where there have been such consultations and it has been predicted by such scientists or the U.N. that the proposed activity was unlikely to cause environmental damage.³⁷ However, use of the U.N. to determine the legality of proposed activities has several drawbacks. The General Assembly represents most nations of the world, but the distribution of voting power in the General Assembly does not reflect the differences among nations in population, territory, state of economic development or military power. Should representatives of 5% of the world's population set binding pollution standards for all nations in the world, especially if that 5% represents mainly less developed nations?³⁸ Should India, the Soviet Union and mainland China be given representation in proportion to their populations?³⁹ Is the Security Council a more "representative" body? Should the veto power extend to decisions on environmental questions?

Use of an international group of scientists to determine liability for proposed activities also has drawbacks. There is an implication from the "scientists" that this group would not be political; but should not the decision as to the legality of proposed activities be made only after comparing the advantages to be gained from the proposed activity with the ecological costs of the activity? Also, a decision by scientists in a particular case may carry with it some of the "solemnity of law;" but achievement of

³⁷ Cf. Draft Rules Concerning Changes in the Environment of the Earth, *supra* note 31, at § 3.

³⁸ [I]t is theoretically possible to secure a majority of 31 votes which represent only a little over 5 per cent of the population of U.N. members. A vote of the 21 smallest countries—representing only about 2.3 per cent of the U.N. population—could prevent the two-thirds majority needed for the approval of "important" resolutions. On the other hand, if a contest should arise between the large and small states, a two-thirds majority could be rolled up by 40 of the smallest nations with a population of only about 11 per cent.

Francis O. Wilcox, Representation and Voting in the United Nations General Assembly (U.S. Senate, Committee on Foreign Relations, Subcommittee on the U.N. Charter, Staff Study No. 4, 1954) as quoted at L. JOHN, UNITED NATIONS LAW 250 (2d ed. 1967). Since 1954 membership in the United Nations has about doubled, mainly by the admission of nations with very small populations.

³⁹ "Three countries—China, India and the Soviet Union—contain more than half the total U.N. population . . ." *Id.*

a consensus among nations in the U.N. would carry with it not only the solemnity of quasi-law, but also implied threats of retaliatory action and reciprocal treatment while holding out the benefits to be gained from cooperation. However, even an "objective" decision by an international authorized group of scientists is likely to be "politicized" when individual nations are required to accept or reject the decision of the scientists in the event that the question of enforcement of the decision should arise.

Even if a centralized decision making authority were to be established, problems of enforcement of its judgments would persist much the same as enforcement problems exist in the nation-state system (unless of course, it is assumed that the central authority has sufficient force to intimidate any nation). In the nation-state system nations, individually and collectively, and power groups, domestic and international, can coerce, cajole and tempt any nation causing or allowing injurious pollutants to escape its boundaries to prevent the occurrence of such detrimental effects. Nations may act collectively, as through the Security Council in response to "any dispute, the continuance of which is likely to endanger the maintenance of international peace and security"⁴⁰ or "any threat to the peace, breach of the peace or act of aggression."⁴¹ Outside of the U.N., nations can act collectively through regional arrangements, on the basis of treaty obligations or on the basis of shared interests.

If nations act individually or collectively outside the U.N., it is arguable that they must first attempt "negotiation, enquiry, mediation, conciliation, arbitration (as was done in the *Trail Smelter* dispute), judicial settlement, (as was done in the *Corfu Channel* case) resort to regional agencies or arrangements, or other peaceful means of their own choice."⁴² If attempts at peaceful resolution of the dispute should fail, then nations may resort to retorsions such as terminating trade and aid, offering additional

⁴⁰ U.N. CHARTER, art. 33, para. 1.

⁴¹ U.N. CHARTER, art. 39, para. 1. The U.N. has authority to perform functions other than peacekeeping, e.g., "[t]o employ international machinery for the promotion of the economic and social advancement of all people. . . ." U.N. CHARTER, preamble. Techniques employed to implement U.N. objectives other than peacekeeping include deprivation, adjudication, negotiation, investigation, publication, education, and compensation. See Carey, *Procedures for International Protection of Human Rights*, 53 IOWA L. REV. 291 (1967).

⁴² U.N. CHARTER, art. 33, para. 1.

aid and breaking diplomatic relations.⁴³ Reprisals (self-help that would ordinarily be illegal), such as reciprocal treatment for the polluting nation, may also be justified because of the polluting nation's breach of law under the standards set in the *Corful Channel* and *Trail Smelter* cases.⁴⁴ Article 51 of the U.N. Charter retains the inherent right of states to individual or collective self-defense "if any armed attack occurs against a Member of the United Nations," and it is possible to argue that the international disregard of disastrous harm which an offending state is causing within the territory of another sovereign can be considered an "armed attack."

Power (military, economic, propaganda) politics will frequently force nations to act in the common interests of all nations, not because of the morality of such action, but because power is diffused among many nations, organizations and groups which often have an interest in the outcome of any particular dispute. Although disparities in power among nations can force weaker nations occasionally to endure deprivations by stronger nations, a common interest among many states can induce the majority

⁴³ U.N. CHARTER, art. 2, para. 4, prohibits "the threat or use of force against the territorial integrity or political independence of any state. . . ." But use of political or economic coercion is not prohibited by the U.N. Charter (at least after resort to negotiation, mediations, etc.) or by customary international law. "We cannot find any established principle of international jurisprudence that requires a nation to continue buying commodities from an unfriendly source." *Banco Nacional de Cuba v. Sabbatino*, 307 F.2d 845, 866 (2d Cir. 1962). The Second Circuit apparently did not consider the effect of Article 16 of the OAS Charter, *infra* note 46.

The Supreme Court in the *Sabbatino* case suggested its preference for a political solution "by bilateral or multilateral talks, by submission to the United Nations or by the employment of economic and political sanctions" unfettered by judicial interference. *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 431 (1964).

Contra, "No state may use or encourage the use of economic, political or any other type of measures to coerce another State in order to obtain from it the subordination of the exercise of its sovereign rights and to secure from it advantages of any kind." Declaration on Principles of International Law Concerning Friendly Relations and Co-operation among States in Accordance with the Charter of the United Nations, Annex to G.A. Res. 2625 (XXV) adopted at the 1883rd plenary meeting on 24 October, 1970 without a vote. Reprinted at 9 INT'L LEGAL MATERIALS 1292, 1295 (1970).

Non-Western States have taken the position that the U.N. Charter, art. 2(7) prohibition of *United Nations* intervention in matters within the domestic jurisdiction of states also prohibits intervention by States and that, as a consequence, States may not use political or economic coercion or other means of intervention to influence another State's domestic policies. D. O'CONNELL, 1 INTERNATIONAL LAW 314 (2d ed. 1970).

⁴⁴ For a general discussion of the nature of reprisal see Falk, *The Beirut Raid and the International Law of Retaliation*, 63 AMER. J. INT'L. L. 415, 428-35 (1969).

of states to act collectively against even a major power. Such collective coercion often will take the form of political pronouncements since power in our bipolarized, interdependent world is measured by "friends" as well as by "guns." If the offending nations are few in number and the adverse effects upon the offended nations are severe enough, the nation-state system provides a means of weighing the interests of states in the continuance or discontinuance of polluting activities and causing the subordination of less important goals to the goal of environmental protection.

Competitive advantage resulting from lax pollution control

International law does not prohibit a nation from damaging its own environment, even though the purpose of enduring such damage is to gain a trade advantage. Polluting activities confined within the territorial limits of the polluting state would appear to fall within the article 2(7) prohibition on U.N. intervention in the domestic affairs of Member states.⁴⁵ Whether that prohibition is defined to mean "dictatorial interference" or "interference pure and simple" (*i.e.*, discussion, recommendations or any action) affects the ability of the U.N. to influence nations to terminate such behavior. Although the *travaux preparatoires* of the U.N. Charter may establish that article 2(7) prohibits any interference, including mere discussion, in matters within the domestic jurisdiction of a state,⁴⁶ U.N. practice has not consistently followed that interpretation of article 2(7).⁴⁷ Of course, it is arguable that internal pollution by a state is a matter of international concern when the state's activities within its borders have international effects.⁴⁸ Such a view, however, cannot be reconciled with the

⁴⁵ See notes 25, 43 *supra* and accompanying text.

⁴⁶ See Gilmour, *The Meaning of "Intervene" Within Article 2(7) of the United Nation's Charter—An Historical Perspective*, 16 INT'L COMP. & L.Q. 330 (1967).

⁴⁷ See REPERTORY OF PRACTICE OF U.N. ORGANS, vol. 1, art. 2(7) para. 342, 343, 352 (1955) and *supp.* 1, VI, art. 2(7) para. 122, (1958); A. ROSS, *THE UNITED NATIONS—PEACE AND PROGRESS* 75 (1966). *But see* D. O'CONNELL, *INTERNATIONAL LAW* 308-10 (2d ed. 1970).

⁴⁸ *Cf.* RESTATEMENT OF FOREIGN RELATIONS LAW OF THE UNITED STATES § 18 (1965) which states:

A state has jurisdiction to prescribe a rule of law attaching legal consequences to conduct that occurs outside its territory, if either
(a) the conduct and its effect are recognized as constituent elements of a crime or tort . . . or

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view that article 2(7) prohibits exercise of U.N. jurisdiction to object to a nation's tariff system or immigration policy. However, discussion of U.N. jurisdiction in this situation may be academic, since the nation-state system has developed means other than U.N. intervention for sanctioning "unfair" trade advantages.

It may not be necessary in many cases to justify U.N. action against a state attempting to gain a pollution-trade advantage. Article VI of the General Agreement on Tariffs and Trade [hereinafter GATT] allows states to impose countervailing duties to offset subsidies or bounties granted to industries when there is an injury to a domestic industry.⁴⁹ If lax pollution laws of State A allow damage to the environment of State A, then State B, whose competing industries are injured by imports from State A, arguably may treat the social costs of State A's lax pollution laws as a subsidy to industry in State A, and State B could therefore impose countervailing duties on goods imported from State A.⁵⁰ One of the difficulties of this approach is that the social costs of pollution in State A might be difficult if not impossible to ascertain. Underestimations would mean that the countervailing duties would be less than social costs (the true amount of the subsidy). Overestimations of social costs would mean that State A is losing the benefit of one of its natural resources, the waste absorption capacity of its environment.⁵¹ One solution to the estimation problem is to allow the imposition of countervailing duties only to the

(Footnote continued from preceding page)

(b)(i) the conduct and its effect are constituent elements of activity to which the rule applies; (ii) the effect within the territory is substantial; (iii) it occurs as a direct and foreseeable result of the conduct outside the territory; (iv) the rule is not inconsistent with the principles of justice generally recognized by states that have reasonably developed legal systems.

⁴⁹ General Agreement on Tariffs and Trade, art. V, VI, 61 Stat. A5 (1947), T.I.A.S. No. 1700, 55-61 U.N.T.S. (effective Jan. 1, 1948). Article VI (3) of GATT states:

No countervailing duty shall be levied . . . in excess of an amount equal to the estimated bounty or subsidy determined to have been granted, directly or indirectly on the manufacture, production or export . . . in the country of origin or exportation. . . .

⁵⁰ If industries in State C which export to State B are injured by State A's pollution subsidy, then State C would, under GATT, have to rely upon State B to impose a countervailing duty. Perhaps GATT should be amended so that State C could take retaliatory action against State A or so that the imposition of countervailing duties be mandatory, regardless of injury or lack thereof to industries in the importing state.

⁵¹ It is important to keep in mind the difference between utilization of the absorption capacity of the environment and damage by over utilization. See *supra* the text preceding note 21.

extent necessary to offset injury whenever the probability of substantial actual damage to the territory of A is established. (Proof of actual damage would frequently be impracticable). This solution could result in underestimation or overestimation of the value of the subsidy granted, but would limit the imposition of countervailing duties to situations where the environmental damage was substantial.

Overestimations of the value of the subsidy are possible but can be justified on the grounds that this is one of the risks which polluters take.⁵² Underestimations of the value of the subsidy are also possible, but, if made intentionally, these underestimations reflect a decision to disregard the competitive advantages created by the subsidy, usually because there is no injury to any industry in the importing state. An even better solution might be to allow the GATT Contracting Parties or a special Panel of Experts to ascertain a fair countervailing duty.⁵³ The countervailing duty solution to the pollution-trade advantage problems would be available even against non-members of GATT since it is assumed that most nations have or could enact domestic legislation similar to that in the U. S. which provides for the imposition of countervailing duties to offset subsidies or bounties granted by foreign countries.⁵⁴

III. ACTIVITIES BEYOND ANY SOVEREIGN'S TERRITORY—THE CASE OF THE NERVE GAS DUMPING

Certain areas of the earth are not subject to assertions of sovereignty by any state. These areas are either *res communis*, belonging to all nations, or *res nullius*, belonging to no nation. The high seas, the deep sea bed, the Arctic and Antarctic regions and

⁵² Article VI of GATT does not allow the imposition of countervailing duties in excess of the subsidy. See note 49 *supra*. An amendment of GATT may be necessary to "legalize" the approach suggested in the text.

⁵³ See generally K. DAM, *THE GATT* 351-76 (1970). A panel of experts was successfully used in the "Chicken War" to determine the dollar value of certain tariff unbindings by the Federal Republic of Germany. See I A. CHAYES, T. EHRLICH, & A. LOWENFELD, *INT'L. LEGAL PROCESS* 249-306 (1968) [hereinafter cited as CHAYES]. If a panel of experts were to set all countervailing duties and if the imposition of countervailing duties was made mandatory, countervailing duties could be used to protect competing industries in all states and not only the state importing the subsidized goods. See note 50 *supra*.

⁵⁴ The imposition of countervailing duties in the United States is required by Section 303 of the Tariff Act of 1930 (regardless of whether or not there has been injury to a domestic industry), 19 U.S.C. § 1303 (1930).

outer space, including celestial bodies, are such areas.⁵⁵ Sovereigns cooperate and compete with each other in the exploitation of these areas, *e.g.*, fishing rights on the high seas. Not all of the uses of these areas are compatible, *e.g.*, use of the oceans as a dumping ground for poisonous wastes and use for fishing can be incompatible. It has been claimed that competition for the resources of commons areas with the lack of any sovereign to regulate the uses of these areas will lead to ecological disaster.⁵⁶ The recent ocean dumping of nerve gas by the U. S. illustrates some strengths and weaknesses of the present international system in regulating activities in one commons area especially susceptible to damage—the marine environment.

During the summer of 1970 the United States announced plans to dump 12,540 obsolete nerve gas rockets into 16,000 feet of water in the Atlantic Ocean approximately 280 miles off the coast of Cape Kennedy, Florida and 150 miles from Abaco Island.⁵⁷ On August 6, Britain's Foreign Office informed U.S. diplomatic officials in London of the great concern held by the Governments of Bermuda and the Bahamas over U.S. plans for disposing of the nerve gas. Fears were expressed for the safety of the inhabitants of these islands as well as for the ecology of the ocean.⁵⁸ On August 7, Secretary General U Thant declared that dumping of the gas in the open sea constituted a violation of international law.⁵⁹ Examination of technical data supplied by the U. S. to clarify its position apparently did not alleviate the fears

⁵⁵ "The high seas being open to all nations, no State may validly purport to subject any part of them to its sovereignty." Art. 2, Convention on the High Seas, 1958 [1962] 13 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82.

On the status of the deep sea bed see G.A. Res. 2340 (XXII), U.N. Doc. A/Res./2340, 18 Dec. 1967 and G.A. Res. 2467A (XXIII), U.N. Doc. A/Res./2467, 21 Dec. 1968. See generally Young, *The Legal Regime of the Deep-Sea Floor*, 62 AMER. J. INT'L. L. 641 (1968).

Article 2 of the Outer Space Treaty, 1967 [1967] 18 U.S.T. 2410, T.I.A.S. No. 6347. Provides "[o]uter space, including the moon and other celestial bodies is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."

The Antarctic Treaty of 1959 prohibits extensions of existing claims or new claims of sovereignty in this area. [1959] 12 U.S.T. 794; T.I.A.S. 4780.

⁵⁶ See Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968); Falk, *Toward Equilibrium in the World Order System*, 64 AM. J. INT'L. L. 217 (1970).

⁵⁷ N.Y. Times, Aug. 6, 1970, at 11, col. 1.

⁵⁸ N.Y. Times, Aug. 7, 1970, at 11, col. 1.

⁵⁹ N.Y. Times, Aug. 8, 1970, at 8, col. 4. Specifically the violations were of the Convention on the High Seas, 1958 [1962] 13 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82 and General Assembly Res. #2340 (22).

of the Bahamas since on August 15 they lodged a strong protest with the United States.⁶⁰ Nevertheless, the gas was dumped.⁶¹

The U.S. nerve gas dumping episode illustrates a value choice between two competing interests, protection against slight damage to the interest of each of many nations by protecting the ocean against a risk of harm vs. protection against a substantial risk of harm to U. S. land and inhabitants.⁶² What rule of international law could force elected U.S. political officials to expose their constituents to the risks of an attempt to detoxify the rockets in the U.S.? Perhaps U.S. courts could have forced a detoxification attempt, but the courts were unwilling to do this absent a clear and compelling statutory command.⁶³ The best solution to the problem of nerve gas weapons disposal would be not to build nerve gas rockets, but the rockets are built for our national defense and a higher priority has traditionally been placed on national defense than environmental protection,⁶⁴ al-

⁶⁰ N.Y. Times, Aug. 16, 1970, at 35, col. 1.

⁶¹ N.Y. Times, Aug. 19, 1970, at 1, col. 1.

⁶² Russel E. Train, Chairman of the Council on Environmental Quality described the ocean dumping plan as "the least undesirable of the available alternatives," and Jesse L. Steinfeld, the Surgeon General of the U.S. Public Health Service urged prompt action to "get rid of this stuff." Dr. Howard Sanders, a marine biologist at the Oceanographic Institute, Woods Hole, Massachusetts, warned that the ocean dumping plan presented "a potential for severe and perhaps catastrophic results," but conceded that the plan "may be the best of a miserable set of choices." N.Y. Times, Aug. 16, 1970, at 11, col. 1.

⁶³ The Environmental Defense Fund attempted to get a permanent injunction against the gas dumping at sea but the injunction was denied. *Environmental Defense Fund v. Risor*, Civil No. 2394-70 (D.D.C. Aug. 11, 1970). A U.S. District Court also refused to enjoin the 1954 nuclear weapons tests on the Bimini Atoll in the Marshall Islands. *Pauling v. McElroy*, 164 F. Supp. 390 (D.D.C. 1958).

⁶⁴ The U.S. has not yet ratified the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare, Geneva, 17 June 1925.

This treaty states:

[T]hat the High Contracting Parties, so far as they are not already Parties to Treaties prohibiting such use, accept this prohibition [on the use of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices], agree to extend this prohibition to the use of bacteriological methods of warfare and agree to be bound as between ourselves according to the terms of this declaration. LXII DEPT. STATE BULL. 541 (1969).

On August 19, 1970 President Nixon and his Secretary of State urged the Senate to give its advice and consent to ratification of this treaty with the reservation of the right to use asphyxiating, poisonous or other gases in retaliation and with the understanding that the treaty does not prohibit the use in war of riot-control agents, chemical herbicides, smoke, flame and napalm. They further pointed out that there are 85 parties to this convention including all of the major military powers in the world with the exception of the United States LXIII DEPT. STATE BULL. 273-74 (1970).

though it is arguable that recent legislation evidences a shift in those priorities.

Secretary-General Thant claimed that the proposed ocean dumping contravened General Assembly resolution 2340 (XXII) and ran counter to Article 25(b) of the 1958 Geneva Convention of the High Seas.⁶⁵ Resolution 2340 established an *Ad Hoc* Committee to study problems of the sea-bed and pointed out "the importance of preserving the sea-bed and the ocean floor, and the subsoil thereof . . . from actions and uses which might be detrimental to the common interests of mankind."⁶⁶ Article 25(b) of the Geneva Convention on the High Seas provides:

All states shall co-operate with the competent international organizations in taking measures for the prevention of pollution of the seas or air space above, resulting from any activities with radio-active materials or other harmful agents.⁶⁷

The Department of State claimed that the planned ocean disposal would not violate "the 1958 Convention on the High Seas, any other provision of international law, or any obligation to the United Nations or any other international organization."⁶⁸

Under U.S. law no funds are to be used for the transportation and disposal of lethal chemical warfare agents outside the U. S. if the Secretary of State determines that such transportation and disposal violates international law.⁶⁹ On July 30, 1970, the finding that the planned dumping of the nerve gas rockets would not violate international law was communicated to the Speaker of the House and the President of the Senate.⁷⁰ It has been determined by the State Department that use of the high seas as a dumping ground was not prohibited by international law, and

⁶⁵ Statement by Secretary-General on Possible Dumping of Nerve Gas in Atlantic Ocean, U.N., Press Release SG/SM/1314, 7 August 1970.

⁶⁶ G.A. Res. 2340 (XXII), adopted by unanimous vote on 18 December, 1967.

⁶⁷ 1958, [1962] 12 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82.

⁶⁸ Press Release 236 dated 7 Aug., 1970, LXII DEPT. STATE BULL. 282 (1970).

⁶⁹ Act of November, 1969, Pub. L. No. 91-121, §409(c)(2), 83 Stat. 204. Section 120(2)(c) of the National Environmental Policy Act of 1969, Pub. L. No. 91-190, requires that a detailed statement concerning alternatives to the environmental impact of ocean dumping plans be submitted to the Council on Environmental Quality.

⁷⁰ LXIII DEPT. STATE BULL. 283 (1970). "... I have not found a basis for a determination that the transport and disposal in question will violate international law." *Id.*

that there was no violation of international law as long as the dumping did not unreasonably interfere with the interests of other states in their exercise of freedom of the seas.⁷¹

The State Department's determination that use of the oceans as a garbage pit does not violate international law was based on the absence of any "codified international law which prohibits or specifically limits dumping waste materials into the ocean"⁷² and on the designation of the specific area where the nerve gas rockets were to be dumped as an international dumping ground on navigational charts.⁷³ The designation of this site as a dumping ground was made by the Oceanographer of the U. S. Navy in 1940, formal notice of the designation was given and it was recorded on navigational charts.⁷⁴ The Oceanographer of the U. S. Navy has no special international authorization to establish dumping zones in the ocean, so that only by the acquiescence implied from the failure of other nations to object to the designation of this area as a munitions, chemicals and explosives dumping site does the fact of designation support the U. S. position.⁷⁵ The lack of any codified international law prohibition on the dumping of waste materials in the oceans taken in conjunction with the established practice of using the oceans as a dumping ground⁷⁶

⁷¹ Cf. Statement by Mr. Rhinelander, Deputy Legal Advisor, Department of State, on August 5, 1970, before the Subcommittee on Oceanography of the Senate Commerce Committee, *id.* at 282-83. See also the testimony of Mr. Rhinelander before the Subcommittee on Oceanography of the Committee on Commerce, Sen. Hearings, Aug. 5, 1970, Serial 91-76 [hereinafter cited as 1970 Hearings].

⁷² 1970 Hearings 65. The U.S. has signed an international convention which prohibits the pollution of certain areas of the high seas by oil; International Convention for the Prevention of Pollution of the Sea by Oil, 1954 [1961] 12 U.S.T. 2989, T.I.A.S. 4900.

⁷³ 1970 Hearings 66. See also statements referring to this area as an "international dumping ground" by Thaddeus R. Beal, Under Secretary of the Army, *Id.* at 5, 11.

⁷⁴ *Id.* at 66. Mr. Rhinelander did not specify to whom notice had been given, but I assume that notice was given to at least all nations with substantial maritime fleets.

⁷⁵ Article 38 of the Statute of the International Court of Justice states:

1. The court, whose function is to decide in accordance with international law . . . shall apply:

(b) international custom, as evidence of a general practice accepted as law:

A constant and uniform usage which is accepted as law by nations is one of the sources of international law. See the Asylum Case (Columbia v. Peru), 1950 I.C.J. 266, 276. The U.S. position is that "the right to dispose of waste materials in the high seas is a traditional freedom of the seas." COUNCIL ON ENVIRONMENTAL QUALITY, OCEAN DUMPING: A NATIONAL POLICY 35 (1970).

⁷⁶ For data on U.S. ocean dumping see COUNCIL ON ENVIRONMENTAL QUALITY, OCEAN DUMPING: A NATIONAL POLICY (1970). The Council estimates that there are about 250 ocean dumping sites off the coasts of the U.S., but

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supports the State Department's view that dumping is one of the freedoms of the seas recognized by the general principles of international law, the exercise of which is limited by Article 2 of the Convention on the High Seas only by the requirement that any freedom of the seas be exercised with reasonable regard to the interests of other states in their exercise of freedom of the seas.⁷⁷

The reasonableness test was apparently considered to be satisfied by the State Department because of the following findings: (1) that marine life is sparse at the 16,000 foot depths of the proposed site;⁷⁸ (2) commercial fishermen do not harvest fish at such great depths;⁷⁹ (3) the maximum adverse environ-

(Footnote continued from preceding page)

"data on disposal sites are still incomplete, with little definitive information on sites off Alaska and Hawaii and outside the U.S. contiguous zone (more than 12 miles offshore)." *Id.* at 1.

About 48 million tons of wastes were dumped at sea off U.S. coasts in 1968, not including wastes that were piped into the seas, small community operations or illicit operations. *Id.* at 1. These wastes included highly toxic industrial wastes such as cyanides, heavy metals, mercaptides, chlorinated hydrocarbons, arsenical and mercuric compounds. These toxic wastes were often carried out to sea in containers and either the containers were weighted and jettisoned or were intentionally ruptured at the surface. *Id.* at 4.

Discovery of unexploded naval projectiles littering a sea mount off San Diego caused the Collier Chemical and Development Company to cease its underwater vacuum dredging operations for phosphate modules. The U.S. Interior Department refused to refund the \$137,000 Collier had paid to them for a lease of the sea mount, but this decision was overruled by the General Accounting Office. W. MART, *THE FRAIL OCEAN* 76-77 (1967).

⁷⁷ The high seas being open to all nations, no State may validly purport to subject any part of them to its sovereignty. Freedom of the high seas is exercised under the conditions laid down by these articles and by the other rules of international law. It comprises, *inter alia*, both for coastal and non-coastal states:

- (1) Freedom of navigation;
- (2) Freedom of fishing;
- (3) Freedom to lay submarine cables and pipelines;
- (4) Freedom to fly over the high seas.

These freedoms, and others which are recognized by the general principles of international law, shall be exercised by all states with reasonable regard to the interests of other States in their exercise of freedom of the high seas.

Convention on the High Seas, Article 2, 1958, [1962] 18 U.S.T. 2313,, T.I.A.S. No. 5200, 450 U.N.T.S. 82.

⁷⁸ Report of Thaddeus R. Beal, 1970 *Hearings*, *supra* note 71, at 7. See also FOLLOW-UP REPORT ON IMPLEMENTATION OF "REPORT OF THE TECHNICAL GROUP TO INVESTIGATE DISPOSAL HAZARDS OF CERTAIN CHEMICAL MUNITIONS," 1970 *Hearings* 127-29.

⁷⁹ Statement of Charles H. Meachen, Commission of Fish and Wildlife, Department of the Interior, 1970 *Hearings* 55.

The site is deeper than any used as a commercial source of fish, and none affected by GB [the nerve gas in the rockets] would be caught for human consumption. Even if caught and consumed, such fish should not be harmful as GB is not a residual compound and does not accumulate in the body. *Id.*

mental impact would be the temporary contamination of about one cubic mile of water;⁸⁰ (4) and due to the great depths and designation on navigational charts as a munitions dumping area, the site would not likely be used for commercial or technological purposes.⁸¹

Opponents of the proposed dumping plan stressed the speculative nature of forecasting the ecological impact of the dumping. Seventeen hundred and six concrete vaults containing GB nerve gas had been dumped in the ocean off the coast of New Jersey in 1967 and 1968 in seventy-two hundred feet of water, but no follow-up was made on the ecological impact of that dump in part because the ship hulk in which the vaults were sunk could not be located after the dumping.⁸² No predumping survey of the dumping site off New Jersey had been made, and postdumping surveys did not involve biological measurements.⁸³ A predump survey including measurement of deep water currents at the disposal site off Florida was made during the period July 5-12, 1970,⁸⁴ but the reliability of current measurements taken over such a short period of time was questioned.⁸⁵ The fish population at 16,000 feet is sparse but there is a wide variety of fish at that depth and they are likely to react more violently to slight changes in their environment than fresh water fish living in shallow waters, fresh water fish being the only living organisms on which the nerve agent was tested to predict the ecological impact of the planned dumping.⁸⁶ It was claimed that not enough is known about the migration habits of fish.⁸⁷ Also, insufficient information existed concerning the duration of the period of contamination.⁸⁸ Three separate panels of experts had indicated that it might be preferable to dispose of the nerve gas by some means

⁸⁰ Report of Thaddeus R. Beal, 1970 *Hearings* at 7.

⁸¹ *Id.*

⁸² See Testimony of Dr. Conrad Cheek, chemical oceanographer of the Ocean Science Division of the Naval Research Laboratory, 1970 *Hearings* 18-19.

⁸³ *Id.*

⁸⁴ *Id.* at 12-13.

⁸⁵ Statement by Dr. Howard L. Sanders, Senior Scientist, Woods Hole Oceanographic Institutions, Woods Hole, Mass., 1970 *Hearings* 26-27.

⁸⁶ Statement of Hon. Russell E. Train, Chairman, Council on Environmental Quality, 1970 *Hearings* 33.

⁸⁷ *Id.*

⁸⁸ *Id.*

other than the planned ocean dumping.⁸⁹ However, no practically feasible alternative was found other than destruction of the nerve gas rockets by nuclear explosion; and the Atomic Energy Commission advised that this last alternative was unsatisfactory primarily because of the instability of the rockets and the time that it would take (about 15 months) to prepare for the nuclear destruction of the rockets.⁹⁰

If dumping in the seas had been prohibited by international law without regard to any tests of "reasonable regard" for the rights of others in the sea, the nerve gas rockets would probably have never been encased in concrete vaults and would have been de-toxified on land long before the rockets became too unstable to handle safely. Codification of a clearly stated law without loopholes would be sufficient to influence most governments to abide by that law most of the time, even if no sanctions are expressly stated in the law.⁹¹ Only under exceptional circumstances would nations be likely to intentionally violate the law, e.g., if it were suddenly discovered that other means of weapons disposal were not practically feasible. But it would be unlikely that nations would plan long in advance to use the ocean as a dumping ground, and it is likely that nations would take greater risks in use of other de-toxification methods before resorting to the ocean dumping grounds. A change in international law as suggested above would constitute a drastic innovation because it would outlaw environmental alterations without the necessity of estab-

⁸⁹ National Academy of Science, *Ad Hoc Committee Report on the Disposal Hazards of Certain Chemical Warfare Agents and Munitions*, June 25, 1969, 1970 Hearings 101; Dept. of Army, *Initial Report of the Ad Hoc Committee to Investigate Disposal Hazards of Certain Chemical Munitions*, July 25, 1969, 1970 Hearings 104; Dept. of Interior, *Second Report of the Working Group on Ocean Dumping of Chemical Munitions*, Nov. 13, 1969, 1970 Hearings 118.

⁹⁰ See Statement of Thaddeus R. Beal, 1970 Hearings 5. It is also possible that political fears of involvement in a controversial issue such as nerve gas weapons disposal was a factor in the AEC decision, although mention of such political factors was not found.

⁹¹ See Hoffman, *The Study of International Law and the Theory of International Relations*, 1963 PROC. AMER. SOC. INT'L. L. 26.

What makes international law so special a tool for states is this solemnity of effects, rather than the fact that its norms express common interests. . . . A situation of dependence or superiority that is just a fact of life can be reversed through political action, but once it is solemnly cast in legal form [peace treaty], the risks of action designed to change the situation are much higher: law is a form of policy that changes the stakes, and often 'escalates' the intensity, of political contests; it is constraint comparable to force in its effects. *Id.* at 34.

lishing an injury to beneficial use caused by the environmental alteration.⁹²

An absolute prohibition on environmental alteration may not be in the best interests of mankind because it would restrict man's use of the waste-absorption capacity of the seas to the extent that waste disposal activities might alter the seas and yet not lessen their economic or aesthetic value. Furthermore, some alterations of the sea environment are intentionally made to increase the value of the sea to man, *e.g.*, killing the red hordes or parasites that feed on the underwater jungle. Even some dumping practices are beneficial, *e.g.*, wrecked autos serve as homes for small fish and certain types of garbage may increase productivity in barren spots in the ocean.⁹³

Imposition of liability only in cases involving unreasonable injury to beneficial uses, on the other hand, lessens the effectiveness of the legal prohibition because of a lack of scientific knowledge concerning the environment and the necessity of weighing opposing values. Will the dumped nerve gas rockets injure living organisms and vegetation in the sea, perhaps in some manner yet to be uncovered by science? Will it impede commercial and technological exploitation of the sea now or in the future? How substantial will the injuries be? How long will the contamination persist, and will it cause irreversible changes in the marine environment? What are the possibilities or probabilities of each of the foregoing?⁹⁴ How are the speculative harms of unknown duration and extent to be weighed against other interests of the state and the interests of other states?

The proposed U.N. solution to the problems created by current permissive international prohibitions on causing damage in common areas is, in part, increased international cooperation leading to agreement on more specific prohibitions.⁹⁵ Whether

⁹² Whether stated in terms of "consideration for the right of other states" or "serious consequences," international law requires that there be an injury or that injury be almost inevitable before the environmental alteration activities are prohibited.

⁹³ W. MARX, *THE FRAIL OCEAN* 80-81 (1967); COUNCIL ON ENVIRONMENTAL QUALITY, *supra* note 76, at 1.

⁹⁴ See Resolution 2340, *supra* note 66, which recognizes the importance of preventing activities which *might* be detrimental to the common interests of mankind. Compare text at note 34 *supra*.

⁹⁵ Cf. By Resolution 2398, A/L. 553, 22 Nov. 1968, the United Nations General Assembly agreed to convene a United Nations Conference on the Human

(Continued on next page)

cooperation is likely and whether specific prohibitions are practicable are the issues discussed in the following section.

IV. INTERNATIONAL CO-OPERATION

If each state is allowed to decide for itself whether or not to pollute the seas and is required to consider only its own national interest in making its decision, then the likely results will be disastrous for the ecology of the seas. This is true because the positive utility to each state which kills one more whale or dumps one more can of garbage into the ocean will usually be greater than the negative effects of its action, *e.g.*, depletion of whales or taxing the ocean's waste absorption capacity, will be shared by many.⁹⁶ Each state acting to promote its own self-interest could cause the worst of all possible worlds for all states in the same manner that the rational decision in a prisoner's dilemma game theory situation leads to prison sentences rather than freedom for the suspects.⁹⁷ Transferred to the ocean-waste disposal field, the prisoner's dilemma appears as follows:

Assumptions:

1. There are only 3 states in the world, A, B & C.
 2. The ocean can absorb 6 units of waste.
 3. The utility of dumping 1 unit of waste is +2.
 4. The disutility of dumping more than 6 units of waste into the ocean is -3 for each unit dumped in excess of 6.
- Disutility is shared equally by all states.

(Footnote continued from preceding page)

Environment in 1972. The objectives of that conference are: (1) to provide a framework for comprehensive consideration within the United Nations of the problems of Human Environment; (2) to focus the attention of Governments and public opinion on the importance and urgency of the environment question; and (3) to identify those aspects of it that can only or best be solved through international co-operation and agreement. *Id.*

The Secretary-General has proposed that a Commission on regional and international co-operation be established at the conference to deal with the identification of environmental problems calling for increased international co-operation and promotion of international and regional agreements to solve these problems. Report of the Secretary-General on Problems of the Human Environment E/4667 at 33, 26 May, 1969. See also Report of the Preparatory Committee for the United Nations Conference on the Human Environment, A/Conf. 48/PC/6, at p. 18, 6 April, 1970.

⁹⁶ See Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

⁹⁷ A. RAPOPORT AND A. CHAMMAH, PRISONER'S DILEMMA 24 (1965); A. RAPOPORT, STRATEGY AND CONSCIENCE 48-57 (1964). "Rational decision" is used in the sense of dominant strategy. *Id.* at 50-52. See discussion in text before note 98.

5. No nation will dump more than 3 units of waste nor less than 2 units of waste.

Based upon the above assumptions there are 4 possible outcomes:

- (1) All three states will each dump 2 units of waste. Each state will, therefore, obtain +4 utility from its activities—total utility of all states will be +12.
- (2) One state will dump 3 units of waste and two states will dump 2 units of waste. One state will therefore obtain +5 utility and the other 2 states will obtain +3 utility—total utility is +11.
- (3) Two states will dump 3 units of waste and one state will dump 2 units of waste. Two states will thus obtain +4 utility and one state will obtain +2 utility—total utility is +10.
- (4) All three states will dump 3 units of waste. Each state will thus obtain +3 utility—total utility is +9.

Assuming that there is no cooperation among these three states in maximizing the utility of all three, the rational decision for each state would be to dump 3 units of waste, thereby creating the worst of all possible worlds (world utility is +9 instead of +12). That the rational decision is to dump 3 units of waste can be explained as follows: Assume that you are the decision maker for State A. If States B and C each dump only 2 units of waste, then the utility to State A of dumping 2 units of waste is +4 and the utility of dumping 3 units of waste is +5. If State B or C dumps 3 units of waste, then the utility to State A of dumping 2 units of waste is +3 and the utility of dumping 3 units of waste is +4. If both B and C dump 3 units of waste, then the utility to A of dumping 2 units of waste is +2 and the utility of dumping 3 units of waste is +3. Regardless of the decision by B and C, A is always best off by dumping 3 units of waste. Applying the same reasoning for B and C, they are also each best off by dumping 3 units of waste. Of course, it is in the common interest of all three states to limit the total dumping of wastes in the ocean to 6 units and this can be accomplished by voluntary cooperation among the States or by a world government with enforcement powers. Voluntary cooperation could work without any centralized en-

forcement power if each state recognized the advantages to be gained from cooperation (utility of +4 for each nation instead of +3) and abided by the decision not to dump more than 6 units of waste into the ocean.⁹⁸

There are several weaknesses in using the above game theory analysis as a predictor of future events, the most important of which are: (1) disutility of exceeding the ocean's waste absorption capacity is not likely to be distributed evenly among all states; (2) in a game with more than one play by each player, the uncooperative move is no longer the dominant strategy, although it is still an equilibrium strategy for each player;⁹⁹ and (3) the marginal utility of dumping one more unit of waste into the ocean is likely to be different for each state or, at least, perceived to be different.¹⁰⁰ These weaknesses in the game make it much more difficult to predict whether players (states) will choose a cooperative or noncooperative strategy.

One purpose of the proposed 1972 U.N. Conference on the Environment is to promote the achievement of the common interests of nations in preventing environmental damage.¹⁰¹ Achievement of cooperation is made more difficult in the real world than in the prisoner's dilemma hypothetical because of differing conceptions of fairness and differing utility scales. There is a wide diversity among nations in terms of industrial development, physical attributes of territory, size of population, etc.; and

⁹⁸ Even if each state agreed not to dump more than 2 units of waste, there still remains the problem of enforcing the agreement. Absent any centralized enforcement power the question for each state becomes—shall I honor my commitment or shall I breach it? This new question can be analyzed exactly like the question of whether or not to cooperate, except that there may be different pay-offs in the new game, either because of the psychological effects of agreement or the greater possibilities that retaliatory action will be taken against the breaching state. Cf. RAPOPORT, *supra* note 97, at 56-57.

⁹⁹ *Id.* at 54. See also *id.* at 33 n.53, citing a similar argument in HUME, 2 A TREATISE OF HUMAN NATURE 239 (Everyman ed. 1952).

¹⁰⁰ [S]trategic analysis postulates 'actors' whose only psychological traits are those which the strategist finds convenient to endow them with or those which the strategists, in their professional involvement, imagine themselves to possess. . . . The strategist will not get the sort of knowledge he wants [effects of psychological factors on strategy] because he does nothing to inquire into its underpinnings, namely, the deep commitment of people, their concepts of equity, their real hierarchies of values (which do not necessarily fit into undimensional utility scales), and their noble and ignoble impulses, which may invalidate the strategist's entire conceptional system. *Id.* at 124.

¹⁰¹ See note 95 *supra*.

therefore, it is unreasonable to assume that the ocean's waste absorption capacity should be equally divided among the nations of the world if it could be so divided. Less industrialized nations are likely to tell industrialized nations, "You have already contributed your share of pollutants, now it is our turn." Overpopulated nations like India may decide that it is better to die from pollutants tomorrow than die of starvation today. Labor and industry in the U.S. could convince the government that oil pollution of the seas is bad, but it is worse to put men out of work and shut down an industry. Military experts may tend to stress the importance of national defense and may suggest that localized pollution of the seas is a burden we must bear, or that yet to be developed technology will save us.

The number of states whose cooperation is needed, the relative interest of each prospective cooperating state in preventing environmental damage, and the perceptibility of the effect of any one state's cooperation or failure to cooperate on the burden or benefit of any other state or group of states will also effect the chances for cooperation.¹⁰² The above conclusion is supported by the observation of Professor Falk that "if the effects [of polluting activities] are more diffuse and represent the cumulative outcome of numerous separate, small instances, each of which may seem trivial, even benign, then the state system shows almost no capacity for successful response."¹⁰³ Of course, widespread dis-

¹⁰² See generally M. OLSON, *THE LOGIC OF COLLECTIVE ACTION* (1965). The last distinction, between the group so large it definitely cannot provide itself with a collective good, and the oligopoly-sized group which may provide itself with a collective good, is particularly important. It depends upon whether any two or more members of the group have a perceptible interdependence, that is, on whether the contribution or lack of contribution of any one individual in the group will have a perceptible effect on the burden or benefit of any other individual or individuals in the group. Whether a group will have the possibility of providing itself with a collective good without coercion or outside inducements therefore depends to a striking degree upon the number of individuals in the group, since the larger the group, the less the likelihood that the contribution of any one will be perceptible. It is not, however, strictly accurate to say that it depends solely on the number of individuals in the group. The relation between the size of the group and the significance of any individual member cannot be defined quite that simply. A group which has members with highly unequal degrees of interest in a collective good, and which wants a collective good that is (at some level of provision) extremely valuable in relation to its cost, will be more apt to provide itself with a collective good than other groups with the same number of members. *Id.* at 45.

¹⁰³ Falk, *Proceedings* at 221.

semination of information obtained through an international environmental monitoring system, assuming that we now possess the technology to operate such a system, could change the perceptibility of the effects of each state's cooperation or failure to cooperate.¹⁰⁴ Also regional pollution prevention organizations can, in addition to eliminating localized pollution, foster cooperation in the numerous acts—cumulative effects situation by creating a group with a greater interest in the matter than any of its individual members.¹⁰⁵

Inspection of recent international conventions appears to support the proposition that cooperation in controlling international pollution is now difficult because of conflicting nationalistic goals and needs, and almost impossible whenever the contribution of any one state is imperceptible. International law does not prohibit or set specific standards for the dumping of waste materials into the seas.¹⁰⁶ Most conventions, like the Convention on the High Seas, embody only the general prohibition on unreasonable interference with the rights of other states. This general principle is not only difficult to apply when damage is caused to a limited number of states,¹⁰⁷ but also, by its own terms, does not prohibit environmental damage which has no perceptible effect upon any state's interests. Prevention of widespread, cumulative effects damages are even more difficult to prevent than the limited effects damage caused by one or a few states because of additional complexity introduced by the need to allocate a limited resource among a large number of states with different interests. One possible solution to this problem is to set specific standards for various polluting activities, preferably on a state by state basis so as to equitably allocate the environment's waste absorption capacity. Two international conventions do attempt to set specific standards for activities dangerous to the environment:

¹⁰⁴ The noticeability of the actions of a single member of a group may be influenced by the arrangements the group itself sets up. A previously organized group, for example, might ensure that the contributions or lack of contributions of any member of the group, and the effect of each such member's course on the burden and benefit for others would be advertised, thus ensuring that the group effort would not collapse from imperfect knowledge. M. OLSON, *supra* note 102, at 45 n.67.

¹⁰⁵ See note 102 *supra*.

¹⁰⁶ See note 72 *supra*.

¹⁰⁷ See *supra* note 93 and accompanying text.

the Convention on Prevention of Pollution of the Sea by Oil¹⁰⁸ and The Limited Test Ban Treaty.¹⁰⁹

One of the stated purposes of the 1963 Treaty Banning Nuclear Weapons Tests in the Atmosphere in Outer Space and Under Water is "to put an end to the contamination of man's environment by radioactive substances."¹¹⁰ The dangers of radioactive pollutants have become infamous: effect on cells, either killing them or causing them to grow wildly; the causation of genetic mutations;¹¹¹ the slow dissipation of radiation pollution;¹¹² and the concentrating ability of radioactivity in the food chain.¹¹³ The 1963 Test Ban Treaty, Art. I, seeks to alleviate these dangers by obligating parties to the treaty:

[T]o prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear explosion, at any place under its jurisdiction or control:

(a) in the atmosphere; beyond its limits, including outer space; or underwater, including territorial water or high seas; or

(b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the

¹⁰⁸ International Convention for the Prevention of the Pollution of the Sea by Oil, 1954 [1961] 12 U.S.T. 2989, T.I.A.S. No. 4900, 327 U.N.T.S. 3.

¹⁰⁹ 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water, 1963 [1963], 12 U.S.T. 1313, T.I.A.S. No. 5433, 480 U.N.T.S. 43.

¹¹⁰ *Id.*, para. 3 of preamble.

¹¹¹ Bongartz, *Muckupery Along the Potomac*, *ESQUIRE*, June, 1970, at 70, 76.

. . . Dr. Ernest J. Sternglass, a Professor of Radiation Physics at the University of Pittsburg, has found that under the path of the fallout cloud from the first small New Mexico atomic blast in 1945, through parts of Texas, Arkansas, Louisiana, Mississippi and the Carolinas, the infant-mortality rate, in the following five years, went up forty to fifty percent. Western states show the same results in the years after the Bikini tests. The babies did not die of radiation; they died of ordinary diseases because they were born less resistant to them. The ones that lived are smaller than average; . . . *Id.*

For more detailed information on Dr. Sternglass' research and some recent rebuttals of his conclusions see Friedlander and Klarman, *How Many Children?*, 11 *ENVIRONMENT* 2 (1969).

¹¹² The half-lives (the time it takes radioactive material to lose one-half of its radioactivity) of some radioactive materials are:

strontium 90—25 years
cesium 137—33 years
plutonium 239—24,360 years
uranium 238—4,500,000,000 years.

Bongartz, *supra* note 111.

¹¹³ Eskimos who ate caribou which fed on lichen, which get their nourishment from the air, have dangerous radiation levels in their bodies. *Id.*

State under whose jurisdiction or control such explosion is conducted.

The Test Ban Treaty does not deal with radioactive pollution caused by the operation of nuclear power plants, waste from nuclear vessels, direct disposal of radioactive waste products or any other possible sources of radiation pollution.¹¹⁴ Delimitation and specification in multilateral treaties of environmental abuses has some obvious advantages: it allows the political branches of government to compare the societal value of a particular activity with the detriments associated with that activity. Whenever nations can agree on priorities, *e.g.* atomic weapons testing vs. maintenance of environmental quality, they can draft the treaty so as to eliminate the possibility of injury to the environment after consideration of not only the value of a particular activity, but also the probabilities or possibilities of harm to beneficial uses of the environment and the probable extent of such harm should it occur. Weaknesses of this approach are also apparent: achievement of a consensus regarding priorities and values is usually a time consuming process; consensus may not be achieved for many reasons;¹¹⁵ and difficulties are encountered in fore-

¹¹⁴ For general articles dealing with nuclear pollution problems see R. CURTIS & E. HOGAN, *PERILS OF THE PEACEFUL ATOM* (1969); Note, *Pollution of the Sea*, 1 U.C.D. L. REV. 161, 183-95 (1969).

¹¹⁵ Approval of the 1963 Limited Test Ban Treaty by the U.S. Senate was facilitated by the belief that Soviet progress in those areas of nuclear weapons technology in which the U.S. was superior would be impeded by the Treaty, and that the Treaty would deepen and complicate divisions among communist countries. Report of the Senate Foreign Relations Committee, S. Exec. Rep. no. 3, 88th Cong., 1st Sess. (1963). The Preparedness Investigating Committee of the Senate Committee on Armed Services reached different conclusions:

First. The U.S. probably will be unable to duplicate Soviet achievements in very high yield weapon technology.

Second. The U.S. will be unable to acquire necessary data on the effects of very high yield atmospheric explorations.

Third. The U.S. will be unable to acquire data on high altitude weapons effect.

Fourth. The U.S. will be unable to determine with confidence the performance and reliability of any ABM system developed without benefit of atmospheric operational system tests.

Fifth. The U.S. will be unable to verify the ability of its hardened second-strike missile system to survive close-in high-yield nuclear explosions.

Sixth. The U.S. will be unable to verify the ability of its missile re-entry bodies under defensive nuclear attack to survive and penetrate to the target without the opportunity to test nose cone and warhead designs in a nuclear environment under dynamic re-entry conditions.

Seventh. The treaty will provide the Soviet Union with an opportunity to equal U.S. accomplishments in submegaton weapon technology.

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seeing all eventual problems and therefore, the treaty, regardless of how specific it is, may require interpretation or may prove to deter non detrimental activities unnecessarily or to fail to safeguard the environment.¹¹⁶ Also, all nations have not become parties to the Limited Test Ban Treaty and so some nations, *e.g.*, France and mainland China, continue to test atomic weapons in the atmosphere over the ocean.¹¹⁷

The Convention for the Prevention of Pollution of the Seas by Oil suffers from many of the same defects which afflict the Limited Test Ban Treaty. The Oil Pollution Convention only applies to sea areas within 50 miles of land and only applies to oil pollution from ships and not from exploration or exploitation activities.¹¹⁸ The "flag of convenience rule" embodied in the Oil Pollution convention assures the major shipping powers that their commercial interests will not be infringed upon by attempts to prevent destruction of the ocean environment.¹¹⁹ The Convention on Civil

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Eighth. The treaty will deny to the U.S. a valuable source of information on Soviet nuclear weapons capabilities.

This material is contained and discussed in Chayes 1020-21.

The issues raised in the U.S. Senate were probably also discussed, from the Soviet point of view, in the Soviet Union before it ratified the Treaty. Perhaps it was only ignorance of the true facts by the U.S. or the Soviet Union or both which led to ratification of the treaty by both. There are also some common interests of the U.S. and the Soviet Union in ratifying the Treaty, *e.g.*, decelerate the arms race with consequent monetary savings and reduction of tensions and the probabilities of nuclear war.

¹¹⁶ Does the Treaty prohibit the use of nuclear weapons in wartime? Did the loss of four hydrogen bombs in the B-52 bomber crash over the Spanish Coast on January 17, 1966, with the resultant contamination of part of the Spanish coast and waters of the Mediterranean constitute a violation of the Treaty? Are underground explosions prohibited if any detectable radioactivity is carried beyond the territorial boundaries of the testing state, or are underground explosions only prohibited if they produce radioactivity which is carried beyond territorial boundaries in quantities sufficient to pose a health hazard to man? For a discussion of the developing law in this field see CHAYES 1022-56.

¹¹⁷ See N.Y. Times, May 16, 1970, at 5, col. 4; N.Y. Times, Sept. 30, 1969, at 30, col. 3.

¹¹⁸ See *supra* note 108, at Preamble and Annex A, para. 1.

¹¹⁹ These interests can only be affected by the sanctions imposed upon ships violating the treaty, and this power is given to the country where the ship is registered. "Any contravention . . . shall be an offense punishable under the laws of the territory in which the ship is registered." 1954 [1961] 12 U.S.T. 2989, T.I.A.S. No. 4900, 327 U.N.T.S. 3, art. III, par. 3. Such sanctions shall be imposed in the form required by law of the registry, art. X, and shall not be less than those imposed upon violations within the territorial waters of the nation of registry, art. VI. It is obvious that this reference to registry gives tacit recognition to the "flags of convenience" rule, and that those countries which have the lightest sanctions may become the locus for registry of the majority of the ships. If this be the case then the convention may operate to defeat its goals.

But cf. Article 5(1) requires that there be a "genuine link" between the

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Liability for Oil Pollution, if ever ratified by the major shipping nations of the world, could constitute a significant step toward protecting the marine environment even though it only applies in cases involving damage to the territory or territorial seas of a state as the result of a shipping casualty.¹²⁰

If international co-operation in protecting the environment of commons areas is unlikely, then solutions to the problem may be either the division of commons areas among sovereigns or creation of an international sovereign for commons areas. Because of the political reality of the concept of sovereignty, creation of a world government for areas other than common areas is not practical at this time. Extension of individual states' sovereignty over commons areas would at least provide institutions with regulatory powers over different parts of commons areas and the need for cooperation on protecting the environment of commons areas would be drastically changed.

V. UNILATERAL EXTENSION OF NATIONAL REGULATORY JURISDICTION OR SOVEREIGNTY

At one time in the history of Western Civilization nations claimed sovereignty over the seas: "Venice claimed the Adriatic, England the North Sea, the Channel and large areas of the Atlantic, Sweden the Baltic, and Denmark-Norway all the northern seas."¹²¹ These nations exercised sovereignty over parts of the high seas to protect shippers and merchants from pirates.¹²² Should individual nations again assert claims of sovereignty over the high seas, this time to protect them from pollution?

The Geneva Conference, in the spring in 1958, resulted in four

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State of registration and the ship, *i.e.*, that the State "effectively exercise its jurisdiction and control in administrative, technical and social matters over ships flying its flag." *Id.*

¹²⁰ International Convention on Civil Liability for Oil Pollution Damage (IMCO conference held at Brussels in 1969) reproduced at 9 INT'L. LEGAL MATERIALS 25 (1970). This convention makes the owner of the vessel liable for damage on a strict liability theory with only limited exceptions and requires proof of financial responsibility up to the limits of liability of \$14,000,000. See Healy, Civil Liability for Oil Pollution: The 1969 Brussels Convention and the United States Domestic Legislation, Proceedings of the Conference on International and Interstate Regulations of Water Pollution 105 (held at Columbia University, Mar., 1970).

¹²¹ J. BRIELY, THE LAW OF NATIONS 304 (6th ed. 1963).

¹²² *Id.* at 305.

Law of the Sea Conventions: (1) Convention on the High Seas¹²³ (2) Convention on the Territorial Sea and the Contiguous Zone,¹²⁴ (3) Convention on the Continental Shelf,¹²⁵ and (4) Convention on Fishing and Conservation of the Living Resources on the High Seas.¹²⁶ These conventions recognize three zones in the sea: the territorial sea, the contiguous zone and the high seas. The territorial sea comprises a zone immediately off the coast of a State extending seaward from a baseline from three to twelve miles in the case of most states, although none of the Geneva Conventions expressly limit the breadth of the territorial sea,¹²⁷ the contiguous zone comprises the zone between the territorial sea and the high seas and may not extend beyond 12 miles from the baseline for measuring the extent of the territorial sea;¹²⁸ the high seas are composed of all waters beyond the territorial sea. The ocean floor is divided into two zones: the continental shelf which consists of

... [T]he sea-bed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas and the deep ocean floor.

The coastal state's interest in regulating pollution beyond its territorial sea is gaining wider recognition. Article 24 of the Convention on the Territorial Sea and the Contiguous Zone declares that within the contiguous zone "the coastal state may exercise the control necessary to

- (a) Prevent infringement of its customs, fiscal, immigration or sanitary regulations within its territory or territorial sea;
- (b) Punish infringement of the above regulations committed within its territory or territorial sea."¹³⁰

¹²³ 1958 [1962] 13 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82.

¹²⁴ 1958 [1964] 15 U.S.T. 1606, T.I.A.S. No. 5639, 516 U.N.T.S. 205.

¹²⁵ 1958 [1966] 17 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285.

¹²⁶ 1958 [1964] 15 U.S.T. 471 T.I.A.S. No. 5578, 499 U.N.T.S. 311.

¹²⁷ U.S. STATE DEPT. GEOGRAPHY BULLETIN No. 3, SOVEREIGNTY OF THE SEA 10 (rev. ed. Oct. 1969). See also *id.* at 28-29, App. A, Table IV.

¹²⁸ Article 24, Convention on the Territorial Sea and the Contiguous Zone, 1958 [1964] 15 U.S.T. 1606, T.I.A.S. No. 5639, 516 U.N.T.S. 205.

¹²⁹ Article 1, Convention on the Continental Shelf, 1958 [1966] 17 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285.

¹³⁰ 1958 [1964] 15 U.S.T. 1606, T.I.A.S. 5639, 516 U.N.T.S. 205.

The concept of the contiguous zone has grown out of States' needs to go outside their territory in order to protect their territory. Historically, protection was needed from smugglers. However, the practice of States has extended exclusive fishing rights of the coastal state into the contiguous zone,¹³¹ and the U. S. has extended jurisdiction to control pollution into the contiguous zone.¹³² Recent conventions on the seas have also tended to extend the reach of national jurisdiction over the seas, *e.g.*, The International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties allows States to take such measures on the high seas as may be necessary to protect their coastlines from pollution or threat of pollution of the sea by oil in the event of a shipping accident.¹³³ The International Convention on Civil Liability for Oil Pollution Damage allows the courts of States whose territory has been damaged by oil escaping from ships to take jurisdiction over actions for compensation.¹³⁴ The International Convention on the Prevention of Pollution of the Sea by Oil prohibits the discharge of oil or oily wastes into the sea within 50 miles (and in some regions up to 150 miles) from land although it gives the coastal state no special authority to act.¹³⁵ The Convention on Fishing and Conservation of the Living Resources of the High Seas gives coastal states, if no international agreement is reached, the right to prescribe the measures necessary unilaterally for the conservation of the living resources of the seas adjacent to the coastal state.¹³⁶

Canada's recent "Act to prevent pollution of areas of the arctic waters adjacent to the mainland and islands of the Canadian arctic"¹³⁷ has been justified on the grounds that international law "does not sufficiently protect countries on the pollution aspect of international waters" and that "it is important for Canada to take forward steps in this area to help international law develop."¹³⁸

¹³¹ U.S. STATE DEPT. GEOGRAPHIC BULLETIN No. 3, *supra* note 127 at 6.

¹³² See Fisheries Zone Contiguous to the Territorial Sea of the United States, 16 U.S.C. §§ 1091-94 (1966).

¹³³ 9 INT'L LEGAL MATERIALS 25 (1970).

¹³⁴ 9 INT'L LEGAL MATERIALS 45, 51 (1970).

¹³⁵ *Supra* note 67.

¹³⁶ 1958 [1964] 15 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 311.

¹³⁷ Bill C-202, reprinted at 9 INT'L LEGAL MATERIALS 543 (1970). Bill C-202 had passed both the House of Commons and the Senate, but had not yet been officially proclaimed as of March 1, 1971. See Bilder, *The Canadian Arctic Waters Pollution Act: New Stresses on the Law of the Sea*, 69 MICH. L. REV. 1 n.1 (1970).

This act prohibits pollution of specified arctic waters within 100 miles of the Canadian coast, grants broad rule-making powers to the Governor in Council, provides for the establishment of shipping safety control zones through these waters, provides for regulation of vessel construction, navigation and operation in these waters, grants broad enforcement powers to pollution control officers and provides for civil and criminal penalties for violations of the act.¹³⁹ Canada's unilateral action has been criticized by some as destructive of freedom of the seas and presaging a claim to full Canadian sovereignty over the 100 mile zone.¹⁴⁰ It is not the purpose of this paper to determine the legality of the Canadian legislation. Canada has amended its acceptance of the compulsory jurisdiction of the International Court of Justice to exclude from its acceptance

. . . disputes arising out of or concerning jurisdiction or rights claimed or exercised by Canada in respect of the conservation, management or exploitation of the living resources of the seas, or in respect of the prevention or control of pollution or contamination of the marine environment in marine areas adjacent to the coast of Canada.¹⁴¹

Therefore, it is unlikely that the legality of the enactment will be definitively determined in the near future.¹⁴²

Similar in some respects to Canada's unilateral extension of regulatory jurisdiction over the seas are the claims of sovereignty extending 200 miles out to sea being made by many Latin American States. The Lima Declaration on the Law of the Sea recognizes the right of coastal states "to establish the extent of their maritime sovereignty or jurisdiction in accordance with reasonable criteria, having regard to their geographical, geological and biological situation and their socio-economic needs and responsibilities."¹⁴³ Resolution 3 passed at the Lima Conference recommends that the conference participants

¹³⁸ Remarks by Canadian Prime Minister Trudeau on Arctic Pollution legislation reproduced 9 INT'L LEGAL MATERIALS 600 (1970).

¹³⁹ For an excellent article describing the Canadian legislation in more detail, see Bilder, *supra* note 137.

¹⁴⁰ See remarks of Prof. Friedmann, *Proceedings supra* note 1, at 23.

¹⁴¹ Canadian Declaration Concerning the Compulsory Jurisdiction of the International Court of Justice, 9 INT'L LEGAL MATERIALS 598, 599 (1970).

¹⁴² For a discussion of the legality of the Canadian legislation see Bilder, *supra* note 137.

... reaffirm their decision to take such steps and measures as they may deem appropriate to prevent, control and reduce or eliminate contamination and other dangerous and harmful effects resulting from the exploration, exploitation and use of the seas adjacent to their coasts. . . .¹⁴⁴

The Declaration of Montevideo on the Law of the Sea justifies claims of 200 mile wide territorial seas, in part, stating:

The scientific and technological progress made in exploitation of natural resources of the sea has created a correlative danger of exhaustion of biological species by irrational or abusive extractive practices, or by the disturbance of ecological conditions, which is the foundation of the right claimed by coastal States to prescribe the necessary measures to protect said resources within jurisdictional zones that are broader than the traditional ones. . . .¹⁴⁵

One difference between an extension of regulatory jurisdiction and an extension of sovereignty can possibly be found in the motives for each type of claim. Latin American claims of sovereignty can be criticized as an attempt by a small group of nations to appropriate for their own benefit resources which have traditionally been considered to belong to all mankind (but have been mainly exploited by fishing interests from the United States, the Soviet Union and Japan). The Canadian legislation has been praised as "an act of abatement taken to prevent irreversible and irreparable harm until multi-lateral agreements to stop the pollution of the Arctic can be reached."¹⁴⁶ It has also been condemned as a national approach to an international problem.¹⁴⁷ Whether there will be differences in reality as well as differences in theory between claims of sovereignty and claims of regulatory juris-

¹⁴³ Declaration of the Latin American States on the Law of the Sea (meeting held at Lima, Peru, August 4-8, 1970), reproduced at 10 INT'L. LEGAL MATERIALS 207, 208 (1971).

¹⁴⁴ Resolution 3, On the Problem of the Contamination of the Marine Environment, *id.* at 211, 212.

¹⁴⁵ Declaration of Montevideo on Law of the Sea, 9 INT'L LEGAL MATERIALS 1081 (1970), signed at Montevideo, Uruguay, May 8, 1970 by the Governments of Argentina, Brazil, Chile, Ecuador, El Salvador, Panama, Peru, Nicaragua and Uruguay.

¹⁴⁶ Remarks by Prof. Spillcott, *Proceedings supra* note 1, at 232.

¹⁴⁷ DEPARTMENT OF STATE, STATEMENT ON GOVERNMENT OF CANADA'S BILLS ON LIMITS ON THE TERRITORIAL SEA, FISHERIES AND POLLUTION, 9 INT'L LEGAL MATERIALS 605 (1970). See also Remarks of Prof. Friedmann, *supra* note 140.

diction cannot be determined in advance by logical analysis. Regulations could be drafted so as to exclude aliens; and sovereign claims could be used as the basis for non-discriminatory regulations.¹⁴⁸ The unilateral action taken by Canada and the Latin American States arguably provides impetus to the search for an international agreement regulating pollution since it restricts the rights of shipping nations to use certain waters. It should also strengthen the bargaining position of Canada and these Latin American States at any conference on pollution of the seas since failure to get their approval of any multilateral convention adopted may result in the continuance of the unilateral assertions of jurisdiction. On the other hand, it can be argued that the need for international pollution regulation in the areas of the seas claimed is abated by these unilateral acts. Furthermore, Canada has expressed reservations about even discussing the subject in an international forum.

The extension of U. S. regulatory jurisdiction over the area in the Atlantic where the nerve gas was dumped would probably not have changed the U.S. decision to dump the nerve gas there. As a matter of fact, such U.S. jurisdiction, if exclusive, would have lessened the restraining influence of world opinion on U.S. polluting activities. The restraining influence of world opinion would have been lessened even more if the U.S. had sovereignty over the area where the nerve gas was dumped because of attitudes concerning intervention in a nation's domestic affairs. Extension of regulatory jurisdiction or sovereignty would therefore tend to increase the capabilities of the sovereign state to pollute its own part of the ocean.

On the other hand, extension of regulatory jurisdiction or sovereignty would tend to decrease environmentally damaging activities carried on by other states in the part of the ocean under U.S. jurisdiction for several reasons. First, unanimous international cooperation would not be a necessary prerequisite to

¹⁴⁸ One possible presumption is that:

In the field of energy known as the law of the sea, the situation is quite simple. With the occasional exception of the English, who have a quixotic inclination to be fair and equitable once in a while, everyone else is motivated by the normal human attributes of selfishness, cupidity and malice towards all.

Wilbert M. Chapman, Director, Marine Resources, Ralston Purina Company, The Law of the Sea, Third Annual Conference Proceedings, International Rules and Organization for the Sea 319 (1968).

the legislation and enforcement of regulations restricting polluting activities. Second, if the U.S. exercised sovereignty over part of the ocean, the U.S. would have an interest in preventing *any* environmental damage in that part of the ocean rather than an interest only in preventing unreasonable interference with the exercise of its freedoms of the seas. Also, states other than the U.S. would only have the right of innocent passage through U.S. territorial waters, thereby limiting the opportunities for other states to directly damage the environment in this area.

Although unilateral extensions of regulatory jurisdiction or sovereignty may reduce direct pollution by outsiders in any particular sovereign's area, it is not likely to reduce the dangers of the widespread, cumulative effects type of damage. Since oceans are not ecologically divisible, many activities which pollute one sovereign's territorial waters will also pollute other sovereigns' territorial waters, *e.g.*, if poison is dumped in one state's territorial waters and kills fish, it may effect fishing in other parts of the ocean either because of the possibility that ocean currents will disperse the poison or because the fish which were killed would have migrated to other areas. Division of the oceans into zones in which individual nations are sovereign creates problems similar in nature to those created by the concept of sovereignty over land, *e.g.*, Canadian based smelter operations can cause air pollution which damages U.S. land¹⁴⁹ and lead from automobile exhaust emissions can pollute waters 200 miles or more off the coast of California and to depths of 30,000 feet.¹⁵⁰ Division of the ocean into private territories would effect the need for cooperation and the bargaining positions of individual states, but would not eliminate the need for international cooperation.

VI. INTERNATIONAL ORGANIZATION

An alternative to "fencing in the oceans as private reserves" is the creation of an international organization for commons areas.¹⁵¹ (It is assumed that nations are unwilling at present to

¹⁴⁹ See *supra* note 32 and accompanying text.

¹⁵⁰ *Lead is Studied in Coastal Fish*, N.Y. Times, Dec. 27, 1970, at 23, col. 1.

¹⁵¹ Several proposals for an international organization to control pollution have been made. See R. FALK, *THIS ENDANGERED PLANT* (to be published by Random House in April, 1971 and which will presumably suggest some type of

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surrender their existing claims of sovereignty over land areas and 3 to 12 miles of coastal waters.) The U.N. General Assembly has approved in principle the establishment of an international regime to govern exploration and exploitation activities of the seabed beyond the limits of national jurisdiction.¹⁵² The United States has submitted to the U.N. a detailed plan for creation of an International Seabed Resource Authority.¹⁵³ Under this plan the continental shelf adjacent to a coastal state belongs to the coastal state out to the 200 meter isobath, and beyond the 200 meter isobath is the International Seabed Area.¹⁵⁴ That part of the International Seabed Area comprising a continental or island margin adjacent to the coastal shelf (but not more than 60 nautical miles wide) shall be governed by the coastal state as an International Trusteeship Area, the remainder of the International Seabed Area shall be governed by the International Seabed Resource Authority. Concurrently with its submission of the Draft United Nations Convention on the International Seabed Area, the United States has proposed "an international convention which would, *inter alia*, fix the boundary between the territorial sea and the high seas at a maximum distance of 12 nautical miles from the coast."¹⁵⁵ The proposed International Seabed Resource Authority would not have authority to regulate activities in the marine environment outside the International Seabed Area and would only have authority to regulate activities in the International Seabed Area to ensure the "protection of the marine environment against pollution arising from exploration and exploitation activities such as drilling, dredging, excavation, disposal

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international organization, see note 5, *supra*); Kennan, *To Prevent a World Wasteland: A Proposal*, 48 FOREIGN AFFAIRS 401 (1970); Baxter, *International Cooperation to Curb Fluvial and Marine Pollution*, Proceedings of the Conference on International and Interstate Regulation of Water Pollution, 73, 76-77, 100 (Columbia University, Mar. 1970).

¹⁵² G. A. Res. 2749 (XXV), Declaration on Principles Governing the Seabed and the Ocean Floor, and the Subsoil Thereof, Beyond the Limits of National Jurisdiction, adopted by a vote of 108 to 0 with 14 abstentions on Dec. 17, 1970.

¹⁵³ Draft United Nations Convention on the International Seabed Area, submitted to the U.N. Committee on Peaceful Uses of the Seabed and the Ocean Floor Beyond the Limits of National Jurisdiction on August 3, 1970, reproduced at 9 INT'L. LEGAL MATERIALS 1046 (1970) [hereinafter cited as Draft Seabed Convention].

¹⁵⁴ Compare, Article 1 of the Convention on the Continental Shelf, 1958 [1966] 17 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285.

¹⁵⁵ 9 INT'L. LEGAL MATERIALS 1046, 1056-57 (1970).

of waste, construction and operation or maintenance of installations and pipelines and other devices. . . ."¹⁵⁶

The effectiveness of any international organization created to protect the marine environment will be greatly affected by three factors: organization, authority and resources. The organization of the International Seabed Resource Authority reflects an attempt to overcome the inequities of single factor formulas such as the "one state-one vote" principle in the General Assembly and impediments to action such as the veto power in the Security Council,¹⁵⁷ by requiring for Council action a majority vote of the "six most industrially advanced Contracting Parties" and a majority vote of "[e]ighteen additional Contracting Parties, of which at least twelve shall be developing countries . . . taking into account the need for equitable geographical distribution."¹⁵⁸ Also, at least two of the members of the Council must be land-locked or shelf-locked countries. Since unanimity is not required for action by the Council, it should be easier to obtain Council action than it would be to obtain unanimous international co-operation.

Unfortunately, the authority given the proposed International Seabed Resource Authority is inadequate for the regulation of the cumulative effects widespread type of pollution problem (and perhaps is also ineffective to prevent damage to the International Seabed Area caused by any activities carried on outside that area) because the Authority is only given power to "prescribe rules and recommended practices" in the International Seabed Area.¹⁵⁹ To be effective in preventing all types of environmental damage to the marine environment, the Authority should be given power to regulate all activities in or on the high seas and power to take action against any State which permits activities to be carried on within its sovereign territory which, either alone or in combination with activities carried on in other areas, presents a threat to the international marine environment. The authority would thereby have power to set standards for sewage waste disposal within a state's territorial seas or auto exhaust

¹⁵⁶ Art. 23(1)(b), Draft Seabed Convention, *supra* note 153.

¹⁵⁷ See general discussion of voting in international organizations, *supra* note 38 and accompanying text.

¹⁵⁸ Art. 36, Draft Seabed Convention, *supra* note 153.

¹⁵⁹ *Id.*

emission standards for the West Coast of the United States if this sewage or these auto exhaust emissions, either alone or in combination with activities carried on in other areas, presented a threat to the international marine environment. The authority would also have power to regulate shipping, fishing, and other activities on the high seas.

The main coercive powers of the Authority would be its licensing powers over shipping, fishing, and seabed exploration and exploitation and the fact that decisions of either the Council or the Tribunal would carry with them the solemnity of law. However, the Authority should also be given the power to withhold disbursement of any of its revenues, as well as the power to refuse to grant licenses, to states which fail to abide by a decision of the Council. The revenues would be used mainly to pay for an international environmental monitoring system and to aid developing nations. A refusal to disburse funds to a developing nation would likely be an effective sanction against such a country, and a refusal to grant a license to a developed nation would likely be an effective sanction against it.

If the powers of the International Seabed Resource Authority were expanded as suggested above, problems of cumulative effects, widespread pollution would be substantially diminished. Ranking of domestic priorities within each state would remain the prerogative of each state, but the cost-benefit framework in which those rankings are made would be considerably altered. Developing nations would receive economic assistance which might enable them to give more attention to environmental quality than they do now, *e.g.*, India might be able to afford a substitute for DDT.

CONCLUSION

Environmental damage can be reduced by unilateral action, *e.g.*, closing airports to supersonic transports, imposing countervailing duties on imports which have been "subsidized" by absorption of the social costs of polluting activities and licensing the dumping of waste materials by nationals in international waters.¹⁶⁰ Cooperation and coercion, the traditional methods of

¹⁶⁰ See excerpts of President Nixon's message to Congress on February 8, 1971:

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promoting common interests, can effectively reduce the prospects of international environmental damage in many situations. Bilateral and multilateral agreements allow states with common interests to take concerted action. However, if the offending nations are numerous or if the offending nations have compelling reasons for continuing their polluting activities, and the effects of those activities are widely dispersed, then cooperative or coercive action is less likely to be effective in preventing environmental damage. In these "cumulative effects" situations cooperation can be fostered by making the effects of a failure to cooperate more perceptible (perhaps by creation of a U.N. environment monitoring system and widespread publication of its observations) and by encouraging the establishment of regional environment protection agencies. Compelling reasons for polluting must be made less compelling, *e.g.*, by decreasing world tensions and perhaps by payment of compensation to less developed countries so as to mitigate hardships which anti-pollution measures may cause for the nationals of these countries. Education of the general public to environmental problems by states and international organizations could help to change attitudes responsible for many polluting activities.

Prevention of environmental damage in the most endangered commons area, the oceans, can be accomplished by the creation of an international organization to act as "sovereign" of the oceans. Such an international organization, with authority to protect the marine environment from all sources of pollution and with substantial licensing and spending powers could influence the decisions of sovereigns, with respect to activities carried on anywhere, by changing the cost-benefit structure in which those decisions are made. Such an organization could have a significant impact on preservation of the terrestrial and atmospheric environment because of the unity of the earth's ecological system. Because of the sanctity of the concept of freedom of the seas and

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I recommend legislation that will require a permit from the Administrator of the Environmental Protection Agency for any materials to be dumped into the oceans, estuaries or Great Lakes and that will authorize the Administrator to ban dumping of wastes which are dangerous to the marine ecosystem.

International Aspects of the 1971 Environmental Program, LXIV Dept. of State Bull., 253, 254-55 (March 1, 1971), also printed as H. Doc. 92-46, 92d Congress, 1st. Sess.

because of fears that an international organization will interfere in states' domestic affairs, there is likely to be substantial opposition to the establishment of any such organization. However, in view of recent trends in ocean and seabed grabs by coastal states, the choice is not likely to be between freedom of the seas and an international organization but rather between an international organization and unilateral extensions of jurisdiction out to sea by coastal states. Although an international marine sovereign would lack the powers of a true world government, it would at least establish a situation more conducive to peaceful international cooperation and promotion of the common interests of mankind than would the division of the oceans' into private sanctuaries of international individual states.